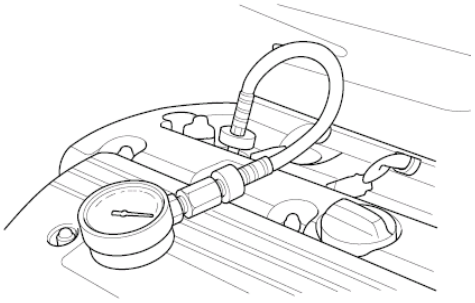
Engine Compression Test and Cylinder Leakage Test

Engine Compression Test

NOTE: After this test, you must reset the engine control module (ECM)/powertrain control module (PCM). Otherwise, the ECM/PCM will continue to stop the fuel injectors from operating.

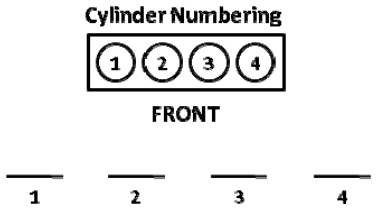
1. Warm up the engine to normal operating temperature (cooling fan comes on twice).
2. Turn the ignition switch to LOCK (0).
3. Connect the Honda Diagnostic System (HDS) to the data link connector (DLC).
4. Turn the ignition switch to ON (II).
5. Make sure the HDS communicates with the vehicle and the ECM/PCM. If it does not communicate, troubleshoot the DLC circuit.
6. Select **ALL INJECTORS STOP** in the PGM-FI, INSPECTION menu with the HDS.
7. Turn the ignition switch to LOCK (0).
8. Remove all ignition coils.
9. Remove all spark plugs.
10. Attach a compression gauge to the spark plug hole of the No. 1 cylinder.



11. Hold the throttle fully open, then crank the engine with the starter motor and count the compression strokes required to reach maximum compression (normally between 6-10).

    NOTE: If the compression gauge does not hold pressure, check for a missing or damaged Schrader valve in the cylinder side of the compression gauge adaptor hose, or in the gauge pressure bleed off port.

12. Record the compression value below, and then measure the compression on the remaining cylinders using the same number of compression strokes. Record their values below, then go to the Cylinder Leakage Test.



Minimum Compression Pressure:
135 psi (930 kPa)

Maximum Variation:
29 psi (200kPa)

Variation Example

Highest Reading	Max Variation	Lowest Reading	Variation
210 psi	29 psi	170 psi	40 psi

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Cylinder Leakage Test

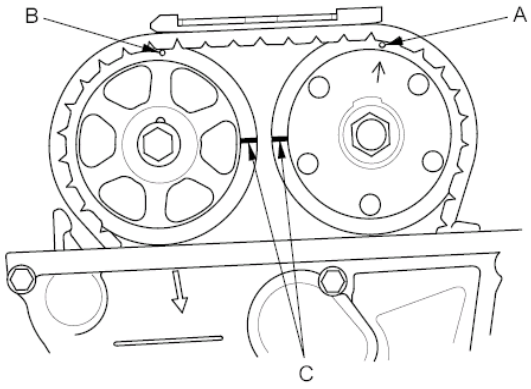
⚠ CAUTION

If the piston is not exactly at top dead center, applying air pressure to the cylinder will rotate the crankshaft. Be certain to remove your tools from the crankshaft, and stay clear of any potential rotating parts when applying the test pressure to the cylinder. Make certain that the vehicle is in P or N with the parking brake set.

NOTE:

- Ensure that the Schrader valve is removed from the cylinder side of the adaptor hose. All of your readings will show 0% leakage if the valve is left in place during testing.
- Disconnect any shop exhaust hoses from the vehicle. The vacuum from these hoses may cause an incorrect diagnosis.
- "K" series L4 engine shown; for other engine types, refer to the appropriate service manual.

13. Remove the cylinder head cover.
14. Set the No. 1 piston at top dead center (TDC). The punch mark (A) on the variable valve timing control (VTC) actuator and the punch mark (B) on the exhaust camshaft sprocket should be at the top. Align the TDC marks (C) on the VTC actuator and the exhaust camshaft sprocket. This procedure only describes DOHC L4 engines.



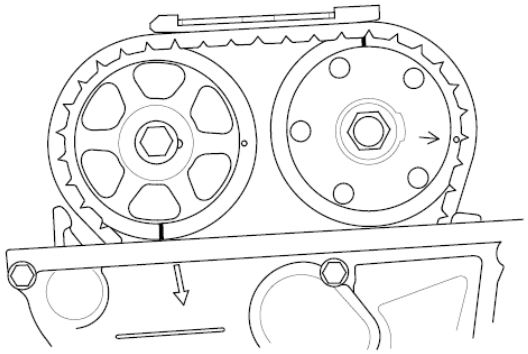
15. Insert the adaptor hose into the No. 1 spark plug hole, and connect the hose to the cylinder leakage tester. Record the cylinder leakage for the No. 1 cylinder. (The cylinder leakage tester must also be connected to shop air.)

    Is the leakage greater than 10%?

    YES – The cylinder leakage is too high. Listen for escaping air in each of these areas: throttle body (fully open), exhaust pipe, radiator (cap removed), and rocker area. Record the area where the majority of the air is escaping. Go to step 16.

    NO – The cylinder leakage is acceptable, go to step 16.

16. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



17. Insert the adaptor hose into the No. 3 spark plug hole, and connect the hose to the cylinder leakage tester. Record the cylinder leakage for the No. 3 cylinder.

    Is the leakage greater than 10%?

    YES – The cylinder leakage is too high. Listen for escaping air in each of these areas: throttle body (fully open), exhaust pipe, radiator (cap removed), and rocker area. Record the area where the majority of the air is escaping. Go to step 18.

    NO – The cylinder leakage is acceptable, go to step 18.

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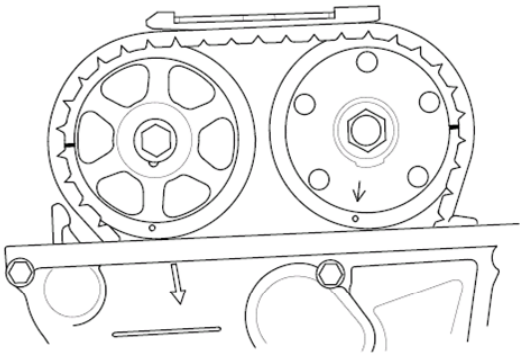
18. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



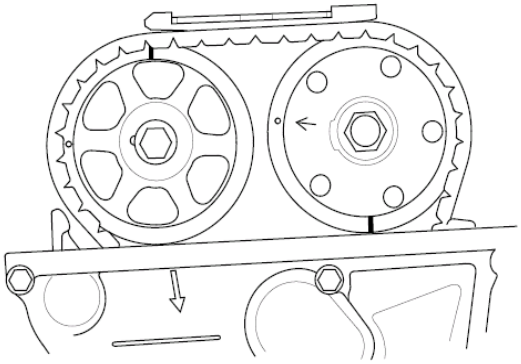
19. Insert the adaptor hose into the No. 4 spark plug hole, and connect the hose to the cylinder leakage tester. Record the cylinder leakage for the No. 4 cylinder.

    Is the leakage greater than 10%?

    YES – The cylinder leakage is too high. Listen for escaping air in each of these areas: throttle body (fully open), exhaust pipe, radiator (cap removed), and rocker area. Record the area where the majority of the air is escaping. Go to step 20.

    NO – The cylinder leakage is acceptable, go to step 20.

20. Rotate the crankshaft 180° clockwise (camshaft pulley turns 90°).



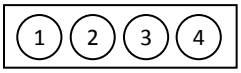
21. Insert the adaptor hose into the No. 2 spark plug hole, and connect the hose to the cylinder leakage tester. Record the cylinder leakage for the No. 2 cylinder.

    Is the leakage greater than 10%?

    YES – The cylinder leakage is too high. Listen for escaping air in each of these areas: throttle body (fully open), exhaust pipe, radiator (cap removed), and rocker area. Record the area where the majority of the air is escaping. Go to step 22.

    NO – The cylinder leakage is acceptable, go to step 22.

22. Record your test results in a chart similar to the one below.



FRONT

	Leakage %	**Leakage Area**
No. 1		
No. 2		
No. 3		
No. 4		

Does any cylinder have leakage greater than 10%?

YES – Go to step 24.

NO – Go to step 23.

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23. Check your cylinder compression results.

    Does the compression vary more than 29 psi between cylinders, or does any cylinder read below 135 psi?

    YES – The engine compression is low and cylinder leakage is normal. Check for each of these conditions:

Low Compression	Inspection Area
One cylinder low	Worn cam lobes
	Broken valve springs
	VCM engines (stuck rocker pins)
	Bent connecting rod
All cylinders read low	Worn piston rings
	Timing belt/chain off a tooth (valve timing)
	Faulty timing belt/chain tensioner

    NO – The engine compression and cylinder leakage is normal. Go to step 28.

24. *Is the majority of the air escaping from the exhaust pipe or throttle body?*

    YES – Go to step 25.

    NO – Go to step 27.

25. Check the valve clearances on the problem cylinder(s).

    - If the valve clearances are insufficient, adjust as needed, then go to step 26.
    - If the valve clearances are OK, go to step 27.

26. Recheck the leakage on the cylinders with high leakage.

    Is the cylinder leakage within specifications?

    YES – Go to step 28.

    NO – Go to step 27.

27. Compare your test results to the chart below, and inspect/repair the associated components as needed.

Leakage Area	Inspection Area
Rocker, oil cap, dipstick tube, breather tube	Piston rings
	Cylinder walls
Throttle body	Intake valves
Exhaust pipe	Exhaust valves
Radiator (bubbles in coolant)	Head gasket
	Engine block
	Cylinder head

28. Remove the cylinder leak-down gauge from the spark plug hole.
29. Reinstall the cylinder head cover.
30. Reinstall the spark plugs.
31. Reinstall the ignition coils.

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